

REMARKS

Favorable reconsideration is respectfully requested.

The claims are claims 1 to 8 with claim 8 being withdrawn from consideration. Thus, Applicants hereby confirm the previous election of claims 1 to 7.

Claims 1 to 5 are rejected under 35 U.S.C. 102(e) as being anticipated by Skee (U.S. 6,465,403).

This rejection is respectfully traversed.

A brief discussion of the present invention will be of assistance in appreciating Applicants' reasons for traversal of the rejection.

The cleaning liquid of the present invention is for removal of a sacrifice layer, which typically comprises a spin-on-glass material, in a process for forming a dual damascene structure comprising steps of etching a low-k layer accumulated on a substrate having thereon a metallic layer to form a first etched space; charging a sacrifice layer in the first etched-space; partially etching the low-k layer and the sacrifice layer to form a second etched-space connected to the first etched-space; and removing the sacrifice layer remaining in the first etched-space with the cleaning liquid of the present invention.

The composition of Skee (U.S. 6,465,403) is for removing metallic and organic contamination from semiconductor wafer substrates without damaging the integrated circuits. Skee does not teach a composition for removing a sacrifice layer in a process of forming a dual damascene structure. Thus, Skee neither discloses nor suggest the present invention.

Claims 1 to 5 are rejected under 35 U.S.C. 102(a) as being anticipated by Payne et al. (U.S. 6,417,112).

This rejection is respectfully traversed.

The composition of Payne et al. (U.S. 6,417,112) is for cleaning post etch residues and copper containing polymeric residues formed when copper is exposed in semiconductor device manufacturing. Payne et al. does not teach a composition for removing a sacrifice layer in a

process of forming a dual damascene structure. Thus, Payne et al. neither discloses nor suggests the present invention.

Claims 1 to 4 are rejected under 35 U.S.C. 102(e) as being anticipated by Hara et al. (U.S. 6,797,682).

This rejection is respectfully traversed.

The composition of Hara et al. (U.S. 6,797,682) is for stripping a photoresist layer and a titanium oxide in production process of semiconductor integrated circuits, printed wiring boards and liquid crystals. Hara et al. does not teach a composition for removing a sacrifice layer in a process of forming a dual damascene structure. Thus, Hara et al. neither discloses nor suggests the present invention.

Claims 1 to 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hara et al. (U.S. 6,797,682).

As is discussed above, the composition of Hara et al. (U.S. 6,797,682) is for stripping a photoresist layer and a titanium oxide in production process of semiconductor integrated circuits, printed wiring boards and liquid crystals. Hara et al. does not teach or suggest a composition for the removal of the sacrifice layer in a process of forming a dual damascene structure. Therefore, it would not have been obvious to one of ordinary skill in the art to formulate a cleaning liquid for removing a sacrifice layer in a process for forming a dual damascene structure.

With respect to claim 7, the rejection states that mixtures of quaternary ammonium compounds may be used. However, Hara et al. does not teach or suggest the mixtures of quaternary ammonium compounds of the formula (I) wherein R_1 , R_2 , R_3 and R_4 each independently represents an alkyl group having 1-4 carbon atoms or a hydroxyalkyl group having 1-4 carbon atoms, and quaternary ammonium compounds of the formula (II) wherein at least one of R_5 , R_6 , R_7 and R_8 represents an alkyl group having 10 or more carbon atoms, or at least two of R_5 , R_6 , R_7 and R_8 each independently represents a hydroxyalkyl group having 2-5 carbon atoms.


No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact undersigned at the telephone number below.

Respectfully submitted,

Shigeru YOKOI et al.

THE COMMISSIONER IS AUTHORIZED
TO CHARGE ANY DEFICIENCY IN THE
FEES FOR THIS PAPER TO DEPOSIT
ACCOUNT NO. 23-0975

By: 

Matthew M. Jacob
Registration No. 25,154
Attorney for Applicant

MJ/kes
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
September 29, 2005